

Ionic liquid as a promising biobased green solvent in combination with microwave irradiation for direct biodiesel production

Abstract

The wet biomass microalgae of *Nannochloropsis* sp. was converted to biodiesel using direct transesterification (DT) by microwave technique and ionic liquid (IL) as the green solvent. Three different ionic liquids; 1-butyl-3-methylimidazolium chloride ([BMIM][Cl]), 1-ethyl-3-methylimidazolium methyl sulphate [EMIM][MeSO₄] and 1-butyl-3-methylimidazolium trifluoromethane sulfonate [BMIM][CF₃SO₃]) and organic solvents (hexane and methanol) were used as co-solvents under microwave irradiation and their performances in terms of percentage disruption, cell walls ruptured and biodiesel yields were compared at different reaction times (5, 10 and 15 min). [EMIM][MeSO₄] showed highest percentage cell disruption (99.73%) and biodiesel yield (36.79% per dried biomass) after 15 min of simultaneous reaction. The results demonstrated that simultaneous extraction-transesterification using ILs and microwave irradiation is a potential alternative method for biodiesel production.